We claim:

1. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant; and

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

2. The self-cleaning window assembly as set forth in claim 1, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

3. The self-cleaning window assembly as set forth in claim 1, wherein said transparent base layer is electrically conductive.

4. The self-cleaning window assembly as set forth in claim 1, wherein said catalytic material is comprised of a precious metal-based catalyst.

5. The self-cleaning window assembly as set forth in claim 1, wherein said catalytic material is comprised of zeolites.

6. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant; and

b) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

7. The self-cleaning window assembly as set forth in claim 6, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

8. The self-cleaning window assembly as set forth in claim 6, wherein said transparent base layer is electrically conductive.

9. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant;

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

10. The self-cleaning window assembly as set forth in claim 9, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

11. The self-cleaning window assembly as set forth in claim 9, wherein said transparent base layer is electrically conductive.

12. The self-cleaning window assembly as set forth in claim 9, wherein said catalytic material is comprised of a precious metal-based catalyst.

13. The self-cleaning window assembly as set forth in claim 9, wherein said catalytic material is comprised of zeolites.

14. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant;

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface and depositing said oxygen into said combustion environment.

15. The self-cleaning window assembly as set forth in claim 14, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

16. The self-cleaning window assembly as set forth in claim 14, wherein said transparent base layer is electrically conductive.

17. The self-cleaning window assembly as set forth in claim 14, wherein said catalytic material is comprised of a precious metal-based catalyst.

18. The self-cleaning window assembly as set forth in claim 14, wherein said catalytic material is comprised of zeolites.

19. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant;

b) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

20. The self-cleaning window assembly as set forth in claim 19, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

21. The self-cleaning window assembly as set forth in claim 19, wherein said transparent base layer is electrically conductive.

22. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant;

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer;

c) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

d) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

23. The self-cleaning window assembly as set forth in claim 22, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

24. The self-cleaning window assembly as set forth in claim 22, wherein said transparent base layer is electrically conductive.

25. The self-cleaning window assembly as set forth in claim 22, wherein said catalytic material is comprised of a precious metal-based catalyst.

26. The self-cleaning window assembly as set forth in claim 22, wherein said catalytic material is comprised of zeolites.

27. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of an oxygen conducting material, said transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment; and

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and

preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

28. The self-cleaning window assembly as set forth in claim 27, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

29. The self-cleaning window assembly as set forth in claim 27, wherein said transparent base layer is electrically conductive.

30. The self-cleaning window assembly as set forth in claim 27, wherein said catalytic material is comprised of a precious metal-based catalyst.

31. The self-cleaning window assembly as set forth in claim 27, wherein said catalytic material is comprised of zeolites.

32. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of an oxygen conducting material, said transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment; and

b) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

33. The self-cleaning window assembly as set forth in claim 32, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

34. The self-cleaning window assembly as set forth in claim 32, wherein said transparent base layer is electrically conductive.

35. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of an oxygen conducting material, said transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment;

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) a means for heating attached to said transparent base layer, said means for heating maintaining said transparent base layer at an elevated temperature and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

36. The self-cleaning window assembly as set forth in claim 35, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

37. The self-cleaning window assembly as set forth in claim 35, wherein said transparent base layer is electrically conductive.

38. The self-cleaning window assembly as set forth in claim 35, wherein said catalytic material is comprised of a precious metal-based catalyst.

39. The self-cleaning window assembly as set forth in claim 35, wherein said catalytic material is comprised of zeolites.

40. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface said inner surface exposed to said combustion environment containing said contaminant; and

b) a catalytic/heat transfer material attached to said transparent base layer, said catalytic/heat transfer material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

41. The self-cleaning window assembly as set forth in claim 40, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

42. The self-cleaning window assembly as set forth in claim 40, wherein said transparent base layer is electrically conductive.

43. The self-cleaning window assembly as set forth in claim 40, wherein said catalytic/heat transfer material is zirconia.

44. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer having an inner and outer surface, said inner surface exposed to said combustion environment containing said contaminant;

b) a catalytic/heat transfer material attached to said transparent base layer, said catalytic/heat transfer material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

45. The self-cleaning window assembly as set forth in claim 44, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

46. The self-cleaning window assembly as set forth in claim 44, wherein said transparent base layer is electrically conductive.

47. The self-cleaning window assembly as set forth in claim 44, wherein said catalytic/heat transfer material is zirconia.

48. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of an oxygen conducting material, said transparent base layer having an inner and outer surface for optical access to said combustion environment, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment; and

b) a catalytic/heat transfer material, such as zirconia, attached to said transparent base layer, said catalytic/heat transfer material interacting with said contaminant in said

combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

49. The self-cleaning window assembly as set forth in claim 48, wherein said transparent base layer is selected from a group consisting of: quartz, zirconia, silica, alumina, and titania.

50. The self-cleaning window assembly as set forth in claim 48, wherein said transparent base layer is electrically conductive.

51. A self-cleaning window assembly for enabling optical access to a combustion environment, comprising a transparent base layer composed of a heat transfer material, having an inner and outer surface for optical access to said combustion environment containing said contaminant, whereby said heat transfer material allows said transparent base layer to be maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant.

52. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of a heat transfer material, said transparent base layer having an inner and outer surface for optical access to said combustion environment, whereby said heat transfer material allows said transparent base layer to be

maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant; and

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

53. The self-cleaning window assembly as set forth in claim 52, wherein said catalytic material is comprised of a precious metal-based catalyst.

54. The self-cleaning window assembly as set forth in claim 52, wherein said catalytic material is comprised of zeolites.

55. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of a heat transfer material, said transparent base layer having an inner and outer surface for optical access to said combustion environment, whereby said heat transfer material allows said transparent base layer to be maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant; and

b) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

56. A self-cleaning window assembly for enabling optical access to combustion environment, comprising:

a) a transparent base layer, composed of a heat transfer material, said transparent base layer having an inner and outer surface for optical access to said combustion environment, whereby said heat transfer material allows said transparent base layer to be maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant;

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer; and

c) an oxygen conducting material attached to said transparent base layer for transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

57. The self-cleaning window assembly as set forth in claim 56, wherein said catalytic material is comprised of a precious metal-based catalyst.

58. The self-cleaning window assembly as set forth in claim 56, wherein said catalytic material is comprised of zeolites.

59. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising a transparent base layer, composed of a heat transfer material which also conducts oxygen, having an inner and outer surface for optical access to said combustion environment, whereby said heat transfer material allows said transparent base layer to be maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment.

60. A self-cleaning window assembly for enabling optical access to a combustion environment containing at least one contaminant, comprising:

a) a transparent base layer, composed of a heat transfer material which also conducts oxygen, said transparent base layer having an inner and outer surface for optical access to said combustion environment, whereby said heat transfer material allows said transparent base layer to be maintained at an elevated temperature in order to assist said transparent base layer in preventing a buildup of, or removing, said contaminant, said transparent base layer further transporting oxygen from said outer surface through said transparent base layer to said inner surface, and depositing said oxygen into said combustion environment; and

b) a catalytic material attached to said transparent base layer, said catalytic material interacting with said contaminant in said combustion environment and preventing a buildup of, or removing, said contaminant from said transparent base layer to enable optical access through said transparent base layer.

61. The self-cleaning window assembly as set forth in claim 60, wherein said catalytic material is comprised of a precious metal-based catalyst.

62. The self-cleaning window assembly as set forth in claim 60, wherein said catalytic material is comprised of zeolites.

63. A method to monitor emission components within a combustion environment containing at least one contaminant, comprising the steps of:

a) providing a transparent base layer to enable viewing said combustion environment containing at least one contaminant, said transparent base layer having an outer surface and an inner surface which is exposed to said combustion environment,

b) optionally, providing a catalytic material to repel said contaminant in said combustion environment,

c) optionally, providing a means for heating to repel said contaminant in said combustion environment, and,

d) optionally, providing an oxygen conducting material within said transparent base layer to increase oxygen content within said combustion environment, for use in reducing environments.